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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
Preparing Activity: KSC

NASA/KSC-27 11 19.00 98 (October 2007)

Superseding
NASA/KSC-27 11 19.00 98 (April 2006)

NASA/KSC GUIDE SPECIFICATIONS

References are in agreement with UMRL dated January 2009

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DIVISION 27 - COMMUNICATIONS

SECTION 27 11 19.00 98

COMMUNICATIONS TERMINATION BLOCKS AND PATCH PANELS

10/07

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SECTION 27 11 19.00 98

COMMUNICATIONS TERMINATION BLOCKS AND PATCH PANELS
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NOTE: This specification covers the requirements for common to all premise wiring sections. Include this section in all project specifications which contain Section 27 11 00.00 98 COMMUNICATIONS EQUIPMENT ROOM FITTINGS, Section 27 15 00.00 98 COMMUNICATIONS HORIZONTAL CABLING, Section 27 53 13.00 98 CLOCK SYSTEMS, Section 27 51 13.00 98 PAGING SYSTEMS and Section 27 15 00.49 98 INTERMEDIATE/RADIO FREQUENCY COMMUNICATIONS. Accordingly, carefully tailor this section to suit project conditions and to meet project requirements and must be checked with Division 1 to avoid conflicts or repetition.

Edit this guide specification for project specific requirements by adding, deleting, or revising text. For bracketed items, choose applicable items(s) or insert appropriate information.

Remove information and requirements not required in respective project, whether or not brackets are present.

Comments and suggestions on this guide specification are welcome and should be directed to the technical proponent of the specification. A listing of technical proponents, including their organization designation and telephone number, is on the Internet.
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PART 1 GENERAL

1.1 REFERENCES

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NOTE: This paragraph is used to list the publications cited in the text of the guide specification. The publications are referred to in the text by basic designation only and listed in this paragraph by organization, designation, date, and title.

Use the Reference Wizard's Check Reference feature when you add a RID outside of the Section's Reference Article to automatically place the reference in the Reference Article. Also use the Reference Wizard's Check Reference feature to update the issue dates.

References not used in the text are automatically deleted from this section of the project specification when you choose to reconcile references in the publish print process.

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The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM E 814	(2008b) Standard Test Method for Fire Tests of Through-Penetration Fire Stops

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2007; AMD 1 2008) National Electrical Code - 2008 Edition

TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA)

TIA/EIA-568-B.1	(2001 Addendums 2001, 2003, 2003, 2003, 2004, 2007) Commercial Building Telecommunications Cabling Standard - Part 1: General Requirements
TIA/EIA-606-A	(2002) Administration Standard for the Telecommunications Infrastructure

UNDERWRITERS LABORATORIES (UL)

UL 1479	(2003; Rev thru Dec 2008) Standard for Fire Tests of Through-Penetration Fire Stops

1.2 SYSTEM DESCRIPTION

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NOTE: Review submittal description (SD) definitions in Section 01 33 00 SUBMITTALS and edit the following list to reflect only the submittals required for the project. Keep submittals to the minimum required for adequate quality control. Include a columnar list of appropriate products and tests beneath each submittal description.

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The premise distribution system must consist of inside-plant horizontal, riser, and backbone cables and connecting hardware to transport signals between equipment items in a building.

Premise distribution systems to be provided under this contract include:

[Telephone]
[Data (LAN)]
[KCCS]
[Timing and Countdown]
[Paging and Area Warning (P/AW)]
[Operational Intercom, (OIS-D)]

Work associated with these systems under this contract must include the following:

a. All spaces, pathways, cable, and terminations, etc., comprising a complete structured cable system. Provide any supplementary systems required to meet the performance requirements of the system as part of the bid.

b. All work within the communications equipment room and communications closet, horizontal and backbone distribution, including but not limited to:

1. Installation of backbone cable and station/outlet wiring as indicated or otherwise required.

2. Installation of equipment racks, patch panels, and associated bonding and grounding systems, which comply with [_____].

3. Termination of all cables and wiring compliant with TIA/EIA-568-B.1, and applicable amendments.

4. Provide all cables for interconnections of all electronic components including necessary jumper/patch cables, cross-connects, etc.

1.3 ENVIRONMENTAL REQUIREMENTS

Connecting hardware must be rated for operation under ambient conditions of, 0 to 60 degrees C and in the range of 0 to 95 percent relative humidity, non condensing. The space in which it is to be installed and operate.

1.4 QUALIFICATIONS

1.4.1 Minimum Contractor Qualifications

All communication cable installation, termination, and testing, must be performed by, and all equipment must be furnished and installed by, a certified Telecommunications Contractor, hereafter referred to as the Contractor. With the exception of furnishing and installing conduit, electrical boxes, and pull wires, this work must not be done by the Electrical Sub-Contractor, unless the below listed qualifications are met. The Contractor must have the following qualifications in Telecommunications Systems installation:

a. Supervisors and installers performing work in the project, must have completed the BICSI Cabling Installation Workshop and be BICSI Certified Installers. Supervisors must have attained the rating of "Technician", and installers must have attained the

rating of "Installer". Submit documentation confirming the above credentials. General electrical trade staff (electricians) must not be used for the installation of the premise distribution system cables and associated hardware.

b. For performance-based systems such as CAT 5E requiring a manufacturer's backed warranty, the installing Contractor must be a certified, factory trained partner or Value-Added Reseller (V.A.R.) of the manufacturer backing the warranty.

1.4.2 Minimum Manufacturer Qualifications

The equipment and hardware provided under this contract must be from manufacturers that have a minimum of 5 years experience in producing the types of systems and equipment specified.

1.5 SUBMITTALS

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NOTE: Review Submittal Description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list to reflect only the submittals required for the project. Keep submittals to the minimum required for adequate quality control.

A "G" following a submittal item indicates that the submittal requires Government approval. Some submittals are already marked with a "G". Only delete an existing "G" if the submittal item is not complex and can be reviewed through the Contractor's Quality Control system. Only add a "G" if the submittal is sufficiently important or complex in context of the project.

For submittals requiring Government approval on Army projects, use a code of up to three characters within the submittal tags following the "G" designation to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office (Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy, Air Force, and NASA projects.

Choose the first bracketed item for Navy, Air Force and NASA projects, or choose the second bracketed item for Army projects.

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Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are [for Contractor Quality Control approval.][for information only. When used, a designation following the "G" designation identifies the office that reviews the submittal for the Government.] Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-07 Certificates

The qualifications of the Manufacturer, Contractor, and the Installer to perform the work specified herein. This must include proof of the minimum qualifications specified herein. Each document must be clearly labeled in accordance with paragraph entitled, "Qualifications," of this section.

1.6 DELIVERY AND STORAGE

Equipment delivered and placed in storage must be stored with protection from the weather, humidity and temperature variation, dirt and dust or other contaminants.

1.7 OPERATION AND MAINTENANCE MANUALS

Commercial off-the-shelf manuals must be furnished for operation, installation, configuration, and maintenance for all products provided as a part of the premise distribution system. Provide specification sheets for all cable, connectors, and other equipment.

1.8 RECORD KEEPING AND DOCUMENTATION

1.8.1 Cables

Provide a record of all installed cable in hard copy format and on electronic media using Windows based software. Coordinate with the Contracting Officer to confirm the file format in which to provide the electronic copy. The cable records must include the required data fields for each cable and complete end-to-end circuit report for each complete circuit from the assigned outlet to the entry facility, per TIA/EIA-606-A.

1.8.2 Termination Hardware

Provide a record of all installed patch panels and outlets in hard copy format and on electronic media. See respective system sections for format of electronic media. The hardware records must include only the required data fields, per TIA/EIA-606-A.

PART 2 PRODUCTS

2.1 FACTORY ASSEMBLED PRODUCTS

Provide maximum standardization of components to reduce spare part requirements. Manufacturers of equipment assemblies that include components made by others must assume complete responsibility for final assembled unit. All components of an assembled unit need not be products of same manufacturer. Constituent parts, which are alike, must be product of a single manufacturer. Components must be compatible with each other and with the total assembly for intended service.

Components of equipment must bear manufacturer's name or trademark, model number and serial number on a name plate securely affixed in a conspicuous place, or cast integral with, stamped or otherwise permanently marked upon the components of the equipment. Major items of equipment that serve the same function must be the same make and model. Exception is permitted if performance requirements can not be met.

2.2 COMPATIBILITY OF RELATED EQUIPMENT

Equipment and materials installed must be compatible in all respects, with other items being furnished and with existing items so that a complete and fully operational system results. Provide maximum standardization of components to reduce spare part requirements. Manufacturers of equipment assemblies that include components made by others must assume complete responsibility for final assembled unit.

All components of an assembled unit need not be products of same manufacturer. Constituent parts that are alike must be product of a single manufacturer. Contractor must guarantee performance of assemblies of components, and must repair or replace elements of the assemblies as required to deliver specified performance of the complete assembly. Components of equipment must bear manufacturer's name or trademark, model number and serial number on a name plate securely affixed in a conspicuous place, or cast integral with, stamped or otherwise permanently marked upon the components of the equipment.

2.3 SPECIAL TOOLS

If any part of equipment requires a special tool for assembly, adjustment or maintenance thereof, and such tool is not readily available on commercial tool market, it must be furnished.

2.4 LIFTING ATTACHMENTS

Provide equipment with suitable lifting attachments to enable equipment to be lifted in its normal position. Lifting attachments must withstand any handling conditions that might be encountered without bending or distortion of shape, such as rapid lowering and braking of load.

2.5 FIRESTOPPING

Firestopping for Openings through fire and smoke rated walls and floor assemblies must be listed or classified by an approved independent testing laboratory for "Through-Penetration Firestop Systems". The system must meet the requirements of "Fire Tests of Through-Penetration Firestops", designated in ASTM E 814, or UL 1479.

Inside of all conduits, the firestop system must consist of a dielectric, water resistant, non-hardening, permanently pliable/re-enterable putty along with the appropriate damming or backer materials (where required). The sealant must be capable of being removed and reinstalled and must adhere to all penetrants and common construction materials, and must be capable of allowing normal wire/cable movement without being displaced.

Patch all openings remaining around and inside all conduit, sleeves, and cable penetrations to maintain the integrity of any fire rated wall, ceiling, floor, etc. All building conduits and sleeves installed and/or used under this contract must be firestopped, or re-firestopped upon cable placement through such passageways. Manufacturer's recommended installation standards must be closely followed (i.e. minimum depth of material, use of ceramic fiber and installation procedures).

PART 3 EXECUTION

3.1 GENERAL

3.1.1 Installation

Install system components and appurtenances in accordance with all applicable codes, manufacturer's instructions, and as shown. Provide necessary interconnections, services, and adjustments required for a complete and operable signal distribution system. Label components in accordance with TIA/EIA-606-A. Penetrations in fire-rated construction must be firestopped in accordance with FIRESTOPPING in this specification. Install conduits, outlets and raceways in accordance with applicable sections of this specification.

Install wiring in accordance with TIA/EIA-568-B.1, and as specified in these specifications. Cables must not be installed in the same cable tray, utility pole compartment, or floor trench compartment with ac power cables. Cables not installed in conduit or wireways must be properly secured and neat in appearance and, if installed in plenums or other spaces used for environmental air, must comply with NFPA 70 requirements for this type of installation.

3.1.2 Rough-In

Coordinate all equipment locations with other trades, other renovation projects, and existing conditions to eliminate interference with required clearances for equipment maintenance and inspections. Coordinate work with other trades and existing conditions to determine exact routing of all cable tray, hangers, conduit, etc., before fabrication and installation. Verify with Contracting Officer exact location and mounting height of all equipment in finished areas, such as equipment racks, communication and electrical devices.

Where more than one trade is involved in an area, space or chase, all must cooperate and install their own work to utilize the space equally between them in proportion to their individual requirements. There is no priority schedule for trades. If, after installation of any equipment, piping, ducts, conduit, and boxes, it is determined that ample maintenance and passage space has not been provided, rearrange work and/or furnish other equipment as required for ample maintenance space. Any changes in the size or location of the material or equipment supplied or proposed, which is necessary in order to meet field conditions or in order to avoid conflicts between trades, must be brought to the immediate attention of the Contracting Officer, and approval received before such alterations are made.

Provide mandated clearances at equipment racks and enclosures, and other equipment requiring maintenance and operation. The Contractor is responsible for all required locations, cutting, patching, coring and associated work for the complete cabling system, at no additional cost to the Government.

3.1.3 Cutting and Patching

Include the required cutting and patching work to perform work. Cut and drill from both sides of walls and/or floors to eliminate splaying. Patch adjacent existing work disturbed by installation of new work including insulation, walls and wall covering, ceiling and floor covering, and other finished surfaces. Patch and/or paint openings and damaged areas equal to

existing surface finish. Cut openings in pre-fabricated construction units in accordance with manufacturer's instructions.

3.1.4 Supports

Provide required supports, beams, angles, hangers, rods, bases, braces, straps, struts, and other items to properly support contract work. Modify studs, add studs, add framing, or otherwise reinforce studs in metal stud walls and partitions as required to suit contract work. If necessary in stud walls, provide special supports from floor to structure above. For pre-cast panels/planks and metal decks, support communication work as recommended by manufacturer.

3.2 PREMISE DISTRIBUTION WIRING TO SYSTEMS FURNITURE

[Provide all tools, equipment, labor and materials required to install telecommunication outlets in work stations, as indicated on the drawings. Wiring must transition from building raceway system (cable tray, bridle rings), to furniture raceway system, in a method as approved by the manufacturer. Where tele-power poles are necessary to transition wiring from above ceiling down to furniture panel, provide number and type of poles required. Route all wiring in the furniture panels in integral raceways.]

[Where systems furniture is indicated on the drawings but is not installed, neatly coil and label conductors for panel mounted outlets in ceiling space above proposed tele-power pole location or other connection point. Outlets located in fixed partitions within workstation, must be completely installed as if systems furniture were installed.]

3.3 TELECOMMUNICATIONS OUTLET

3.3.1 Faceplates

As a minimum, label each jack as to its function and a unique number to identify cable link.

3.3.2 Cables

Unshielded twisted pair cables must have a minimum of 150 mm of slack cable loosely coiled into the telecommunications outlet boxes. Minimum manufacturers bend radius for each type of cable must not be exceeded.

3.3.3 Pull Cords

Install pull cords in all conduit serving telecommunications outlets which do not initially have cable installed.

3.4 TERMINAL BLOCKS

Mount terminal blocks in orderly rows and columns. Provide adequate vertical and horizontal wire routing areas between groups of blocks. Utilize industry standard wire routing guides.

3.5 EQUIPMENT RACKS AND CABINETS

Open frame equipment racks and cabinets must be bolted to the floor slab. Cable guides must be bolted or screwed to racks. Install racks level. Bolt together ganged racks. Ganged rack cabinets must have adjacent side

panels removed. Secure wall mounted racks to the mounting surface to prevent fully loaded racks from separating from the mounting surface.

3.6 RACK MOUNTED EQUIPMENT

Securely fasten equipment to be rack mounted to racks by means of the manufacturer's recommended fasteners.

3.7 TERMINATION

Terminate all cables unless otherwise noted. Cables and conductors must sweep into termination areas; cables and conductors must not bend at right angles. Manufacturer's minimum bending radius must not be exceeded. When there are multiple system type drops to individual workstations, maintain relative position for each system on each system termination block or patch panel.

3.8 GROUNDING

Install signal distribution system ground in the telecommunications entrance facility and in each telecommunications closet, in accordance with [_____]. Connect equipment racks to the electrical safety ground.

3.9 ADDITIONAL MATERIALS

Provide additional materials (spare parts) required for facility startup, as indicated in the respective specification sections.

3.10 ADMINISTRATION AND LABELING

3.10.1 Labeling

All labels must be in accordance with TIA/EIA-606-A. Label each connector at the faceplates as indicated on the drawings. Label all patch panels as indicated on the drawings. Labels must not be handwritten, but must be made using a device which produces a typewritten print on a permanent marking, to secure around cable in a permanent manner.

3.10.2 Testing

Materials and documentation to be furnished under this specification are subject to inspections and tests. Terminate all components prior to testing. Equipment and systems are not accepted until the required inspections and tests have been made, demonstrating that the signal distribution system conforms to the specified requirements, and that the required equipment, systems, and documentation have been provided.

Test each outlet post-termination using an appropriate instrument to verify both the integrity of all conductors and correctness of the termination sequence.

3.11 FIRESTOPPING

Provide materials and products listed. The system must meet the requirements of "Fire Tests of Through-Penetration Firestops" designated ASTM E 814, to be used inside all conduits and sleeves. Caulk on exterior of conduit penetration. Provide firestop system seals at all locations where conduit, fiber, cable trays, cables/wires, and similar utilities pass through or penetrate fire rated wall or floor assembly. Provide firestop

seal between sleeve and wall for drywall construction.

The minimum required fire resistance ratings of the wall or floor assembly must be maintained by the firestop system. The installation must provide an air and watertight seal. The methods used must incorporate features/characteristics that permit the easy removal or addition of conduits or cables without drilling or use of special tools. The product must adhere to itself to allow repairs to be made with the same material and permit the vibration, expansion and/or contraction of any items passing through the penetration without cracking, crumbling and resulting reduction in fire rating. Typical rating:

a. Floors - 3 hours.

b Corridor Walls - 2 hours.

c. Offices - 3/4 hour.

d. Smoke Partitions - 3/4 - 1 hour.

-- End of Section --